*241 /6/ which may easily be fitted into the following outline of the technical development of a garden plot:

1. Choosing the site and the quality of the soil.
2. Determing the size and shape of the new plot.
3. Clearing the undergrowth.
4. Felling the trees.
5. Burning the felled vegetation.
6. Piling up and burning the remaining brush.
7. Digging and planting.
8. First and second weeding of the plot.
9. "Tearing up" the plot (pulling up the manioc roots, gathering the harvest).
10. Replanting the garden.

Let us now take up these tasks, one by one.

*242 [181] 1. Choosing the site and the soil. The Indian is, by nature, a practical person. When he is thinking of preparing a plot, he naturally looks for conditions that will most facilitate his task and ensure the safe growth of his garden. For this purpose, he chooses the land most favorable to horticulture, for all sites are not adequate to planting. Preferably, he sets up his plot on slightly sloping ground or on a mild incline, so that rain water and freshets will drain immediately. He takes flat ground only when it is somewhat sandy, permitting rain water to trickle down to the subsoil rather than remain stagnant in the field. This is also the reason why gardens are not set up in humid lowlands: the roots, the tubercles would rot. Aside from this, [825] he also makes sure that there are no ant nests or vermin on the chosen site. Ants would cut down all the manioc, ruining the garden completely.

Even when he finds a site in good circumstances, the Indian is faced with the question of what he can plant in this soil. As a rule, he has a good knowledge of soils and their qualities, and from the experience of generations he knows, almost intuitively, what he can expect from them. In other words, he understands /7/ empirically what he can plant there and what the result will be under normal circumstances. The size of the plot derives, at least in part, from

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242 this estimate. Through repeated tests he finds out the type of the soil and draws the necessary conclusions. As a rule, he proceeds as follows: with the machete, he digs a hole and examines the soil.
[823] By crumbling it between his fingers, he finds out its quality by touch. He distinguishes three types: sandy, clayey, and black, allowing for certain variants and intermediary types, according to the composition and percentage of clay or sand. He makes these soil tests at various depths and in various places when he suspects that only a thin layer is involved, or to find out how far /the layer/ extends. The type of garden also depends on the type of the soil; in other terms: depending on what he wishes to plant, he has to choose a /specific/ type of soil. For this reason, in his hunting forays through the forest, the Indian pays attention to the ground through which he passes in order to find out where he will find appropriate soil when he needs it. The following rule applies as a general norm:

242 194
sandy soil: good only for bitter manioc; inadequate for other plants.

[845] clayey soil: good especially for bitter manioc, tubercles in general, and also for banana plantations; other plants do not grow well in this soil.

[849] black soil: good for everything. For this reason, black soil is always sought out and preferred. This is the tobacco ground par excellence.

241 2. Size and shape of the plot. As was already partly explained, the size of the plot depends on the quality of the soil. If /the Indian/ [242] finds the chosen soil somewhat weak, he figures out beforehand that the harvest will be less satisfactory, and makes the plot somewhat larger. From the practice he has acquired since youth, he empirically figures out the area that will be needed. To do this he does not use measurements, as our peasants do ("braças," "varas," and such).
[804] I attempted in various ways to find out how the Munduruku figures out the size of the plot he is about to prepare. The answers were always the same: "... just by looking, you already know ..." /8/ or "... just by looking...." If the family has grown through the years,

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*241 or if other relatives have come to live in the house, then the plot is [804] made larger. The calculation is thus basically intuitive, even though it is based on practical experience gathered through generations.

*241 Nowadays, the Indian usually plants a little more than he needs 177 for his own use, to obtain a surplus (along with the surplus of rubber [437] he has gathered) and improve his lot by using it in the purchase of clothes, nets, machetes, etc. The garden, therefore, helps him to maintain his economic balance at his present stage of acculturation.

[242] Another factor which also depends in part on the terrain is the shape of the plot. Here, however, other elements are already in evidence, especially the influence of neo-Brazilian acculturation. Whenever possible, the Munduruku prefer the traditional shape, which is rounded or elliptic-oval. Thus did the ancestors make their plots, and thus they are made to this day in the villages of the interior. Still in 1957, this garden shape could easily be distinguished when flying over the villages of the Kabitutu and Pararokti. But this is no longer an iron rule. "It depends on the terrain," they told me. But I believe that the influence of the peasants is stronger than that of the terrain. Thus we find gardens of various shapes, elongated, rectangular, and even square. The latter predominate especially in [361] the Cururú and Tapajós region, and thus in areas where the Munduruku no longer live in village communities but in isolated dwellings. The [182] dismembering of the community and the emancipation of the Munduruku family from the village system are reflected here as they are in many other aspects of the culture.

*241 3. Clearing—tyut tatabm. To clear is to cut down the undergrowth with the machete, removing from the site of the future garden shrubs, young trees, and brush. This is done to prepare for the next task, which is the felling of the trees. In this way, the woodcutters have greater freedom of action. After the trees are felled, it would be impossible to clear the ground of undergrowth. As a rule, the clearing is done in three days' work, and some time is allowed to elapse for the brushwood to dry.

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241

10. Replanting—yabi kudn or warabm yup maum. Once the garden has been torn up, that is, when the harvest is completed, the plot is abandoned and lies fallow. When the soil is very good, a replanting is attempted. The ground is again weeded and cleaned, and if the need exists, the refuse of the field—branches or small shrubs—are burned. The new planting is done. This replanting process is also used in urgent cases, when the Indian is unable because of illness or some other circumstance to prepare a new plot. When a replanting is done with the sole purpose of taking advantage of the soil, a new plot is almost invariably cleared, although it is small and sometimes adjacent, merely enlarging the old one. The [244] Indian knows perfectly well that the yield of a replanting is much smaller than that of a new garden. Because of this, he must supply the portion which the replanted ground will fail to produce. Frequently, the fallow or newly torn-up field is used merely to plant [245] banana trees, if the soil is appropriate.

Nowadays, gardens are indispensable to the Mundurukú's existence. He is still a hunter, a fisherman, and a gatherer of wild fruit. But without the gardens, he could not survive. He himself would regard as absurd the thought of subsisting merely on hunting and gathering. He knows how to utilize his gardens and the plants he cultivates, extracting from them a series of by-products which contribute to his subsistence. (10)

241
171

10. It is rather interesting to compare the native agricultural methods with those of the peasants on the lower Amazon. Wagley, in his study of "Uma comunidade amazônica /An Amazonian Community/" (1957: 100 pp.), describes, in more general terms, the same procedure of garden clearing, planting, and cultivation, in short, of horticulture, among